2000 ANNUAL REPORT

December 1, 1999 – November 30, 2000

The Enhancement of Overall Student Performance Through a Statistics Research Program for Students who are Recruited into Science, Engineering and Mathematics Programs

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1. PROJECT OVERVIEW AS GIVEN IN ORIGINAL PROPOSAL

A primary goal of this project is to improve the quality of science, engineering and mathematics programs at Alabama A&M University (AAMU). Another goal is to increase the number of under represented bachelor degree graduates who are prepared to do graduate work in the sciences. The project proposed to achieve its goals by using a five-fold approach: 1) Recruit high-ability students into a summer enrichment program for recent high school graduates who have committed to major in science, engineering or mathematics (SEM). 2) Provide each recruit with a scholarship provided he/she enrolls in SEM during follow-on fall semester. 3) Require each recruit to take a core of courses in statistics and mathematics while retaining a major in SEM. 4) Have each participant to formulate and execute a statistics research plan and report findings in a well-written report. 5) Have PI to engage in extensive research on student performance at AAMU. We have completed two years and three months of activities and this document provides a summary. The scholarship program supported by this project is known as The Mathematics Scholarship Program (MSP).

2. ACTIVITIES

2.1 Proposed Activities for December 1, 1999 - November 30, 2000

- Design recruitment brochure that describes the Mathematics Scholarship Program for 2000-2001 academic year.
- Mail recruitment brochure to high schools throughout AAMU's recruitment region.
- Deadline for accepting application will be March 17, 2000.
- Successful candidates will be notified by April 21, 2000.
- In June 2000, the second group of summer participants arrive on campus. Orientation will include presentations by representatives from Arts and Sciences dean and the housing office.

- In August 2000, summer participants return for Fall Semester and enroll in regular university program.
- In November 2000, MSP Director submits third funding period report.

2.2 The Computer Laboratory Lab

The Mathematics Computer Lab was developed during the first year (1998-99) of this funded project. It contains a server which supports all mathematics faculty office computers and a computation/research lab which contains 25 computers. This lab also contains computer adaptive test packages which are used for mathematics course placement and exit-course assessment. Computation packages such as SAS, MAPLE, Minitab and others are available to students and faculty. Data collected by use of computer testing packages are merged with information from various other university areas to form a student assessment data base. These merged data sets are analyzed by using the SAS statistical package.

2.3 Student Recruitment for Year 2000

In January 2000, the Administrative Assistant of MSP revised the 1999 MSP Recruitment Brochure to include characteristic descriptions of the 2000 MSP. A copy of this brochure, along with an application form, was sent to each high school in the AAMU recruitment region. As a result, twenty-six complete applications were received and ten of these applicants were awarded MSP scholarships. The ten successful applicants arrived on the AAMU campus on June 2, 2000 and started an eight-week summer program. Of the ten MSP new students, all remain and have registered for spring semester 2001.

2.4 Summer Program 2000

The summer program required the ten new participants to attend precalculus algebra and trigonometry classes where mathematical modeling concepts were developed. Class lectures were supplemented by required computer lab assignments where students learned to use MAPLE and SAS. Additional activates

included weekly seminars where speakers came from on-campus and off-campus organizations. Two afternoons per week were reserved for recitations where students presented solutions to assigned modeling problems.

2.5 The MSP Classes of 1999 and 2000

Of the fifteen MSP students who enrolled in fall semester 1999, eleven remain in the MSP. This means that four of the fifteen have dropped out of the MSP. Of the four dropouts, two remain at AAMU with GPA's that are larger than 3.25 but decided to switch out of SEM because of a lack of success in calculus I or II. One student transferred to another university but remain in SEM. The fourth dropout had excellent academic ability but chose to withdraw from AAMU because of an extremely low GPA.

As mentioned in section 2.3, all of the ten MSP students who entered in year 2000 remain at AAMU and in MSP. This means that MSP presently contains a total of twenty-one students.

2.6 Summer Internships for Year 2000

Of the eleven students in the MSP who entered in 1999, six participated in summer internships for summer 2000. One student attended Harvard University's four-week Minority Program in Biostatistics, three students participated in the eight-week Annual Summer Internship Program (Biostatistics) at the University of Wisconsin, one student was assigned to AAMU's Research Internship Program and one accepted an internship at Williams Gas Pipeline Company of Owensboro, KY. Each internship participant was assigned a suitable research activity and the participant produced a written report which described his/her research. Some made oral reports to the host organization.

2.7 Graduate Students

Two graduate assistants graduated in the year 2000 with Masters degrees in education: one in summer and another in fall. A third graduate assistant was hired in fall 2000. All three were enrolled in the Masters level mathematics education program. Graduate student number one earned her B.S. degree in Industrial Engineering from the University of Alabama and has three years of

work experience as an engineer. Graduate student number two earned her B.S. degree in Applied Statistics from the University of South Carolina and has taught high school mathematics for two years. Graduate student number three earned her B.S. degree in Chemical Engineering from Auburn University and worked as an engineer for five years. All of these students learned to use SAS, MAPLE, Minitab and assisted with computer lab instruction for MSP students. All graduate assistants maintained a cumulative GPA of 4.0 and expect to enter a Ph. D. program.

2.8 Other Student-Workers

Five undergraduate student workers are employed by the MSP. These students are SEM majors who have been assigned to a variety of duties such as computer lab assistants, tutors in mathematics, statistics or a physical science. Each student-worker is associated with at least one SEM faculty member who serves as a mentor for the student-worker.

2.9 Fall 2000

A total of twenty-one scholarship students plus one graduate assistant enrolled for the fall semester of year 2000. At fall semester's end, the twenty-one undergraduates have a cumulative average GPA of 3.32 while the graduate student has a 4.00 cumulative GPA. Five of the MSP undergraduates have GPAs that are below 3.00. These five students will receive counseling and tutoring.

2.10 Summer Internships for Year 2001

A majority of the twenty-one MSP participants are expected to apply for summer internship participation in year 2001. Each participant has attended seminars on resume and research paper preparation. The Administrative Assistant of the MSP has compiled a list of internship opportunities (with website addresses), which has been distributed to MSP members. The internship list range from individual universities that sponsor specialized internship programs to a website published by The American Statistical Association which contains many internship announcements. Several students have taken the initiative to

identify unique research opportunities that are different from those shown above. For example, one student has made an arrangement through a relative to visit London, England where he will study biology for two months.

2.11 Senior Project

Two undergraduate student-workers described in section 2.8 are seniors and one of these students enrolled in the Mathematics Department's senior project class during Fall Semester 2000. The Director of the MSP served as this student's mentor. The role of the mentor in this situation is to assist the student in the (1) selection of a suitable research project, (2) conduct of research, (3) preparation of a well-written report that describes the research results and (4) preparation of an oral report which is presented to student peers and faculty.

The above mentioned student presented his paper to the AAMU mathematics faculty and students on December 5, 2000. A revision of the paper has been accepted for presentation at The National Conference on Undergraduate Research which will be held in Lexington, KY on March 15-17, 2001.

3. DISSEMINATION

The 1998 and 1999 Annual Progress Reports described previous dissemination activities. Since that time, this PI and members of his MSP have shared ideas of this project at several on-campus and off-campus seminars. The following presentations are planned or have been presented.

- Temple, Enoch C. (2000)
  "Student Performance Assessment Research and It's Application to Curriculum Development". Appeared in Materials Presented at The NASA MU-SPIN Ninth Annual User's Conference. Miami, Florida. September 21-25, 1999.

- McCants, Theresa (Administrative Assistant to MSP)
  "A Description of the Mathematics Scholarship Program". Presented at an AAMU Seminar, Fall 2000.

- One MSP student-worker's paper accepted for presentation at The National Conferences on Undergraduate Research (NCUR). Lexington, KY, March 15-17, 2001.

- Two MSP student's posters accepted for presentation at NCUR. Lexington, KY, March 15-17, 2001.

4. SPIN-OFFS FOR AAMU

The activities of this funded project resulted in or influenced the below spin-offs.

- Increased quality and quantity of graduate students who are prepared to serve as statistical consultant to AAMU graduate and undergraduate students.

- The PI is conducting high quality research which will be very useful for assessing student performance. This research will be very beneficial for the evaluation and improvement of the various AAMU programs and curricula. Self-study reports will also be enhanced.

- Increased number of undergraduate mathematics majors who apply and participate in summer internship programs.

- Increased number of SEM majors who seek to make research presentations at off-campus undergraduate research organizations.

- Increased number of faculty members who are willing to supervise undergraduate research projects.

5. RESEARCH ON STUDENT PERFORMANCE

See The 1999 Annual Progress Report. The research described there is ongoing.

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14. ABSTRACT

This document summarizes the progress made on grant N00014-98-1-0764 during this period December 1, 1999 – November 30, 2000. The objective of the grant is to 69 recruit freshmen students into science, engineering and mathematics and to do research on student performance assessment. Section 1 gives a statement of the project's goals and methods used to achieve goals. Section 2 provides a detailed description of project activities for year 2000. Dissemination activities and project spin-offs are provided in sections 3 and 4.

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